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ABSTRACT

The curriculum guide outlines a course for grades 11 and 12 designed to provide instruction in the layout and construction of various types of stairs. Students completing the course will be expected to have skills and knowledge of building construction plans, concrete forms, walls, roofs and doors, in addition to a basic knowledge of mathematics and a positive attitude regarding the value and dignity of work. Course goals, specific block objectives, and course outlines are provided for the following seven instructional blocks: introduction to stair building; concrete stairways; form layout and construction; basic wood stair construction; wood residential staircases; applied mathematics; and a Quinmester posttest. A bibliography and sample of the Quinmester posttest are appended. (Author/NH)

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AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

Course Outline

CARPENTRY - 9163
(Stair Types and Mathematics)

Department 48 - Quin 901896

DADE COUNTY PUBLIC SCHOOLS

DIVISION OF INSTRUCTION • 1974

CE 003 219

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D A D E C O U N T Y P U B L I C S C H O O L S

1 4 5 0 N O R T H E A S T S E C O N D A V E N U E

M I A M I, F L O R I D A 33132

Course Outline

CARPENTRY - 9163
(Stair Types and Mathematics)

Department 48 - Quin 901896

county office of

VOCATIONAL AND ADULT EDUCATION

THE SCHOOL BOARD OF DADE COUNTY

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Dr. E. L. Whigham, Superintendent of Schools
Dade County Public Schools
Miami, Florida 33132

October 9, 1974

Published by the School Board of Dade County

Course Description

9163	48	901896	Stair Types and Mathematics
State Category Number	County Dept. Number	County Course Number	Course Title

Overview: A study of types of stairs, the designing, construction and the kinds of materials used.

Objectives: Students will calculate, lay out and construct a stair mock-up.

Content: A study of the types, parts, layout and construction of wood stairs and forms for concrete stairs.

Selection Considerations: Students in this course will have the skills and knowledge of building construction plans, concrete forms, walls, roofs and doors, in addition to a basic knowledge of mathematics.

PREFACE

This eighth quinmester course outline is designed to provide instruction in the layout and construction of various types of stairs. The student will develop positive attitudes regarding the value and dignity of work.

This course is divided into seven (7) blocks and may be taught in a double quinmester (2 hour block) for 90 clock hours or a (3 hour block) for 135 clock hours.

Students in this course will be expected to have the skills and knowledge of building construction plans, concrete forms, walls, roofs and doors, in addition to a basic knowledge of mathematics.

This advanced course is presented in grades 11 and 12. Upon completion of this course, students will indicate the knowledge, the understanding and the skills to construct stairs.

Instruction is accomplished by means of lectures and demonstrations. Emphasis is placed on manipulative processes.

The bibliography lists materials offering additional information in this field.

This outline was developed through the cooperative efforts of instructional and supervisory personnel and the Vocational Curriculum Materials Service, and has been approved by the Dade County Vocational Curriculum Committee.

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with Suggested Hourly Breakdown

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Wood Stairways	1
Quality and Design	1
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Calculating Unit Rise	1
Calculating Stair Run	2
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GOALS

The student must be able to:

1. Demonstrate the ability to develop attitudes, skills, knowledge and values required for entering the carpentry trade.

2. Understand the varied career opportunities available in the construction field.

3. Participate in the class activities of layout and construction of stairs.

4. Lay out and construct a stair section containing at least three steps according to a sketch or print.

SPECIFIC BLOCK OBJECTIVES

BLOCK I - INTRODUCTION TO STAIR BUILDING

The student must be able to:

1. Explain the difference between concrete stair forms and stairs built of wood.
2. Describe two kinds of stair form lumber.
3. Define total rise and total run.

BLOCK II - CONCRETE STAIRWAYS

The student must be able to:

1. Define unit rise and unit run.
2. Demonstrate an understanding of the class safety rules.
3. Name the basic parts of an indicated wood stairway.

BLOCK III - FORM LAYOUT AND CONSTRUCTION

The student must be able to:

1. Name and describe the three main parts of a concrete stair form.
2. Name and describe five of the six component parts of the wood staircase.
3. State why caution is required when removing concrete stair forms.

BLOCK IV - BASIC WOOD STAIR CONSTRUCTION

The student must be able to:

1. Explain the 5/4" measurement applying to the thickness of lumber.
2. Calculate and lay out a stair stringer predetermined by the instructor.
3. Describe the difference between planking and 5/4" lumber.

BLOCK V - WOOD RESIDENTIAL STAIRCASES

The student must be able to:

1. Define straight run, landing, and open newel type stairways.
2. Explain what is meant by a "mortised" stringer.
3. Indicate where molding would be used on a staircase.

BLOCK VI - APPLIED MATHEMATICS

The student must be able to:

1. Determine the angle cuts on both ends of a stair stringer.
2. Indicate in metric measure the dimensions of treads, risers, and stringers.
3. Calculate in metric measure the necessary problems pertaining to layout and construction of stairs.

BLOCK VII - QUINMESTER POST-TEST

Course Outline

CARPENTRY - 9163
(Stair Types and Mathematics)

Department 48 - Quin 901896

I. INTRODUCTION TO STAIR BUILDING

A. Purpose and Methods
1. Types of stairways
2. Size and design
3. Materials
4. Safe treads and railings
5. Landings
6. Spiral stairways

B. Layout and Construction
1. Calculating stair run
a. Unit rise
b. Unit run
2. Concrete stair forms
a. Stringers
b. Risers
c. Stripping

C. Wood Stairways
1. Unit rise and run
a. Framing square layout
b. Scribing and cutting
c. Assembling
2. Straight run
3. Open newel with and without landing

D. Quality and Design
1. Component parts
a. Round or square balusters
b. Molded or plain handrail
c. Square or round newel
d. Tread
2. Workmanship
a. Time
b. Material quality

II. CONCRETE STAIRWAYS

A. Calculating Unit Rise
1. Headroom height
2. Stairwell length
3. Total rise
4. Total run
a. Unit run
b. Unit rise

B. Calculating Stair Run
   1. Headroom height
   2. Total rise
   3. Stairwell length
      a. Unit rise
      b. Unit run

III. FORM LAYOUT AND CONSTRUCTION

A. Stringers and Risers
   1. Riser and tread layout
      a. Framing square
      b. Stair gauges or fence
      c. Unit rise and unit run
      d. Scribing
   2. Form bottom installation
      a. Sizing and nailing
      b. Stiffening and bracing
      c. Shoring and bracing
   3. Form assembly locating
      a. Staking
      b. Bracing
      c. Nailing
   4. Riser forms
      a. Installing to line
      b. Double headed nailing
         (1) Riser form backing blocks
         (2) Double headed nailing

B. Form Removal
   1. Removing after curing
   2. Removing while green
      a. Careful nail and form removal
      b. Troweling and finishing
      c. Form cleaning and oiling
   3. Protective stair barricade
      a. Remove forms as tread safeguards
      b. Nail wooden strips securing forms

IV. BASIC WOOD STAIR CONSTRUCTION

A. Stringers
   1. Plank or 5/4" lumber
   2. Total rise
   3. Total run
      a. Unit run
      b. Unit rise
   4. Riser and tread layout
      a. Unit rise and unit run fixed on framing square
      b. Scribe and precision cut
         (1) Repeat operations for second stringer
         (2) Original as pattern for second stringer

B. Treads
   1. Plank or 5/4" lumber
      a. Tread 7½" minimum
      b. Desired length
   2. Risers not required
   3. Tread to stringer extension
      a. Measure and scribe
      b. Locate and nail
   4. Finish
      a. Remove rough edges
      b. Oil stain or oil paint

V. WOOD RESIDENTIAL STAIRCASES

A. Stringer and Step Assembly
   1. Straight run type
   2. Mortised stringers
      a. Wall attached
      b. Open stringer
   3. Treads and risers
      a. Treads inserted and wedged
      b. Risers inserted and wedged
      c. Treads nailed through risers
   4. Trim
      a. Molding under tread edge
      b. Stringer and base board molding

B. Banister Assembly
   1. Round baluster installation
      a. Balusters to tread layout
      b. Tread boring
      c. Baluster inserting
      d. Baluster to railing inserting
   2. Newel post assembly
      a. Newel to floor-step construction
      b. Railing to newel attaching
      c. Plumbing and securing

VI. APPLIED MATHEMATICS

A. Linear and Angles
   1. Using framing square
   2. Stringer calculating
      a. Unit rise
      b. Unit run
   3. Framing square tables
      a. Rafter
      b. Essex
      c. Octagon
      d. Brace

B. English and Metric
   1. Stringer layout
      a. Length of diagonal
      b. Upper floor to full run point
      c. Angle cuts at both ends considered
      d. Length divided by 900 step layouts
   2. Handrail
      a. Length of diagonal
      b. Upper anchor point to newel
      c. Rail baluster bore plumb with tread bore
   3. Treads and risers
      a. Length and width
      b. Stringer mortised depth considered

C. Concrete Stair Forms
   1. Length and width of side or stringer
   2. Length and width of riser forms
   3. Length and width of form bottom
      a. Square measure
      b. Linear measure of stiffeners, shores and braces

VII. QUINMESTER POST-TEST

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A P P E N D I X

Quinmester Post-Test Sample

QUINMESTER POST-TEST

Name_____ Date_____ Score_____

Multiple Choice

1. The term "layout" means to
   a. recline.
   b. measure and scribe.
   c. decline.
   d. scribe and draw.

2. A safe stair tread is one which is
   a. rough.
   b. smooth.
   c. sticky.
   d. long.

3. Total run is the vertical projection length of the
   a. step.
   b. tread.
   c. riser.
   d. stairway.

4. Round balusters are part of the
   a. balance.
   b. tread.
   c. step.
   d. staircase.

5. Total rise is the height of the
   a. staircase.
   b. unit rise.
   c. riser.
   d. room.

6. Information referring to stairs is found on the
   a. handrail.
   b. instructions.
   c. framing square.
   d. steel tape.

7. Wood treads are partially supported by the
   a. baluster.
   b. dowel.
   c. risers.
   d. newel.

8. The newel part of the banister is the
   a. post.
   b. stringer.
   c. baluster.
   d. hand rail.

9. The framing square is a
   a. square only.
   b. cutting tool.
   c. combination tool.
   d. finisher.

10. A newel post supports the
   a. molding.
   b. handrail.
   c. baluster.
   d. bottom step.

11. A stair tread is usually wider than the
   a. headroom.
   b. total run.
   c. unit run.
   d. riser.

12. The essex table is found on the
   a. steel tape.
   b. shop floor.
   c. diagonal.
   d. framing square.

13. The total rise is the distance from the floor to the
   a. upper floor surface.
   b. ceiling.
   c. top step.
   d. top tread.

14. Concrete stair form lumber compares to
   a. wood stairs.
   b. footing forms.
   c. baluster wood.
   d. mortised pine.

15. The layout of steps on a stringer requires
   a. five tools.
   b. a folding rule.
   c. calculations.
   d. mortising.

16. Unit run times the number of treads equal
   a. total run.
   b. total rise.
   c. unit run.
   d. unit rise.

17. Total run divided by number of treads equal
   a. total rise.
   b. total run.
   c. unit rise.
   d. unit run.

18. Total rise divided by unit rise equal the number of
    a. railings.
    b. newels.
    c. treads.
    d. risers.

19. Total rise and total run is necessary for laying out a
    a. stringer.
    b. rise and fall.
    c. baluster.
    d. run angle.

20. Stairwell length is the measurement of the
    a. opening.
    b. stringer.
    c. total treads.
    d. projection.

ANSWER KEY TO QUINMESTER POST-TEST

1. b
2. a
3. d
4. d
5. a
6. c
7. c
8. a
9. c
10. b
11. d
12. d
13. a
14. b
15. c
16. a
17. d
18. d
19. a
20. a